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RESEARCH ARTICLE

The study of lipid profile in patients of chronic renal failure

Gurpreet Singh Sran, Maxima Anand and Devinder Singh Mahajan

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Abstract

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*Corresponding Author

Gurpreet Singh Sran.

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Introduction:-

The term chronic renal failure (CRF) applies to the process of continuing significant irreversible reduction in nephron number and typically corresponds to CKD stages 3-5.¹ Renal failure refers to a condition where the kidneys lose their normal functions which may be due to various factors including infections, autoimmune diseases, hypertension, diabetes and other endocrine disorders, cancer and toxic chemicals. It is characterised by reduction in the excretory and regulatory functions of the kidney. It is the ninth leading cause of death in United States as well as most industrialized nations throughout the world.^{2,3}

Chronic kidney disease (CKD) is defined as a structural or functional abnormality in kidneys or a glomerular filtration rate (GFR) of less than 60 ml/min persisting for duration of more than 3 months.¹ CKD is a condition in which the kidneys fail to remove metabolic end products from the blood and regulate the fluids, electrolytes and pH balance of extracellular fluids. The underlying causes may be renal disease, systemic disease or urinary tract disorders of non renal origin.⁴

Aims and objectives:-

To compare the prevalence of dyslipidemia in patients of chronic renal patients on conservative management and that on hemodialysis.

Material and method:-

The present study was undertaken in the department of medicine in collaboration with department of biochemistry in Sri Guru Ram Das Institute of Medical Sciences and Research. 60 patients of CRF coming to OPD as well as emergency of Sri Guru Ram Das Institute of Medical Sciences and Research, Amritsar were included in this study. Informed consent was taken from all the subjects included in the study and the approval from hospital ethical committee was taken.

The glomerular filtration rate of the patients was estimated according to "COCKROFT GAULT FORMULA" as mentioned below:

$GFR = (140 - \text{age} \times \text{body weight/serum creatinine} \times 72) \times 0.85$ for females.

Table 1 Stages of CKD according to National Kidney Foundation:-

Stage	Description	GFR (mL/min/1.73m ²)
1	Kidney damage with normal or increased	≥90
2	Kidney damage with mildly decreased	60-89
3	Moderate kidney disease	30-59
4	Severe kidney disease	15-29
5	Kidney failure	<15 or dialysis

AGE DISTRIBUTION:**EXCLUSION CRITERIA**

- Patients with type 2 Diabetes
- Patients with liver disorders
- Family h/o hyperlipidemia
- Patients on lipid lowering drugs
- Patients with thyroid disorders.

A detailed history and thorough clinical examination was carried out on each patient. Following investigations will be performed in each patient:

- Haemogram (haemoglobin, total leukocyte count, differential leukocyte count, platelet count).
- Serum creatinine, blood urea.
- Fasting lipid profile (total cholesterol, triglyceride, HDL, LDL, VLDL).
- T₃, T₄, TSH.
- Serum bilirubin (direct, indirect), SGOT, SGPT.
- Fasting blood sugar.
- Electrocardiogram.,USG abdomen.

Observations:-

The study population comprised of 2 groups each having 30 patients – group 1 patients on conservative management and group 2 patients on hemodialysis. 60 patients of CKD with 55% males and 45% females. The mean age of study population was 57.03 years in conservative management patients and 54.87 years in hemodialysis patients. Number of patients in Stage 3, Stage 4 and Stage 5 of CKD were 18.33 % (n =11), 21.66 % (n = 13) and 60% (n = 36) respectively.

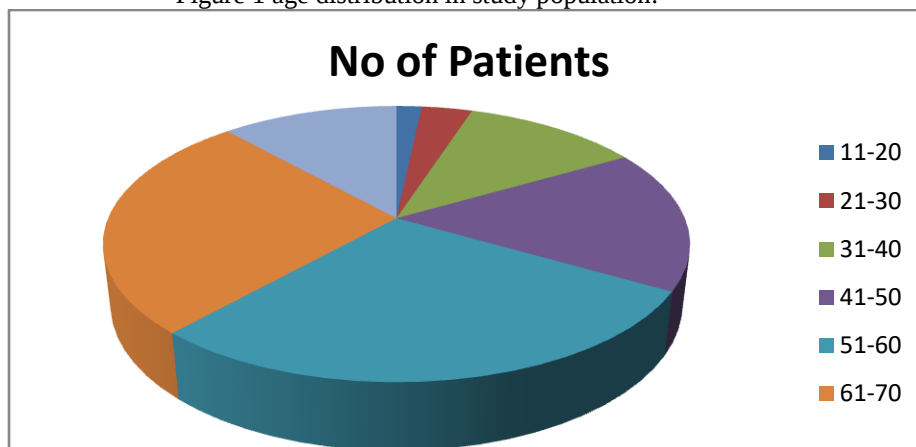
The following observations were made:

Table 1 Age distribution with modality of treatment

	Stage 3		Stage 4		Stage 5	
AGE	CM	HD	CM	HD	CM	HD
11-20						1
21-30			1			1
31-40	3					4
41-50	1		2		2	5
51-60			5		2	10
61-70	6		3		2	5
71-80	1		1			5

Maximum number of patients were in the age group of 51-70 years consisting of 55% of all cases. Age of patients varied from 11 years to 80 years.

Figure 1 age distribution in study population:-

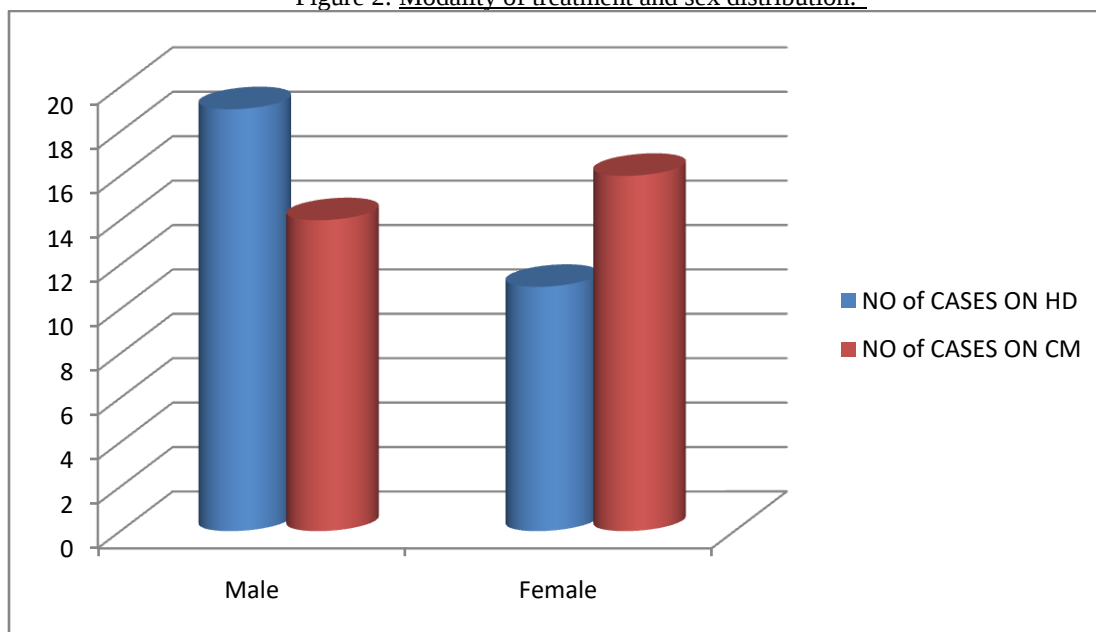
**Modality of treatment and sex distribution:-**

Out of 30 patients on HD 19 were males and 11 were females whereas out 30 patients on CM 14 were males and 16 were females.

Table 2:-

Sex	Patients on hemodialysis	Patients on conservative management
Male	19	14
Female	11	16

Figure 2: Modality of treatment and sex distribution:-

**Modality of treatment and levels of HDL**

When the levels of hdl were correlated with modality of treatment that out of 30 cases on CM, 11 (7M+4F) showed normal levels of HDL, 2(1M+1F) showed increased levels of HDL and 17 (6 M+11 F) showed decreased levels of

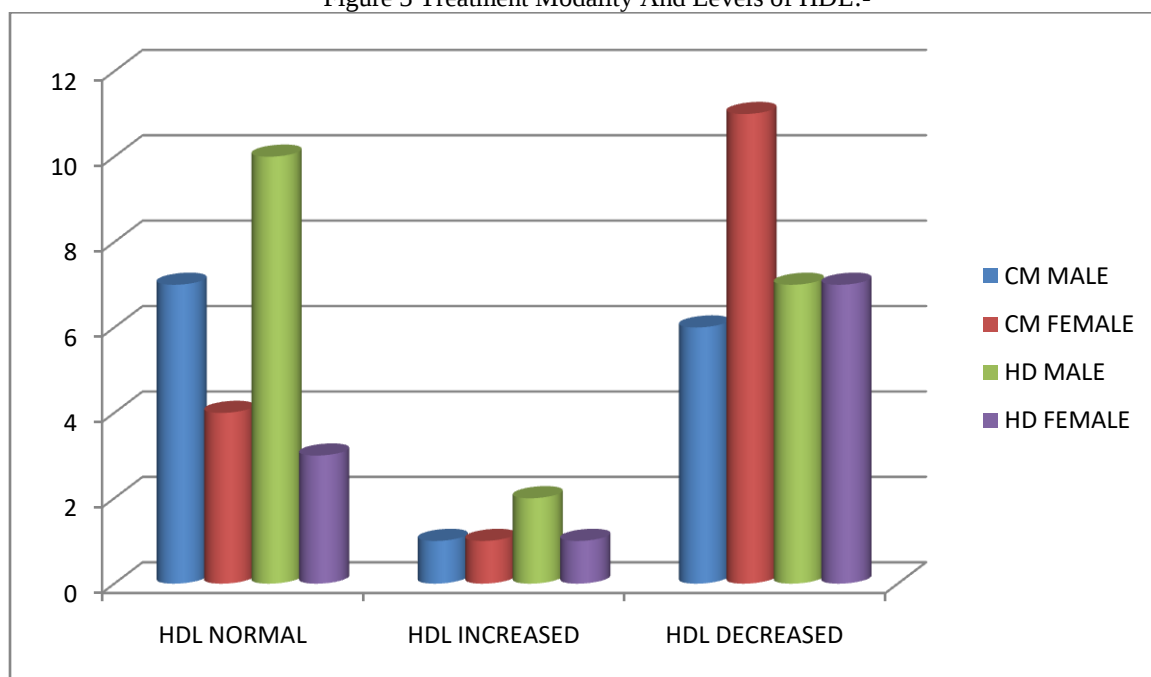
HDL. Out of 30 cases on HD normal levels were seen in 13 patients(10 males+3 females) and increased levels in 3 patients (2 males + 1female) and decreased levels in 14 patients(7 males +7 females)

On statistical analysis the value of HDL level with treatment modality was not significant .

Table 3 Treatment Modality And Levels of HDL:-

TABLE 3 Treatment Modality and Levels of HDL					
HDL	No. of Cases				P value
	CONSERVATIVE MANAGEMENT (CM)		HEMODIALYSIS (HD)		
	Male	Female	Male	Female	
NORMAL	7	4	10	3	0.79
INCREASED	1	1	2	1	
DECREASED	6	11	7	7	

Figure 3 Treatment Modality And Levels of HDL:-



Treatment modality and levels of LDL

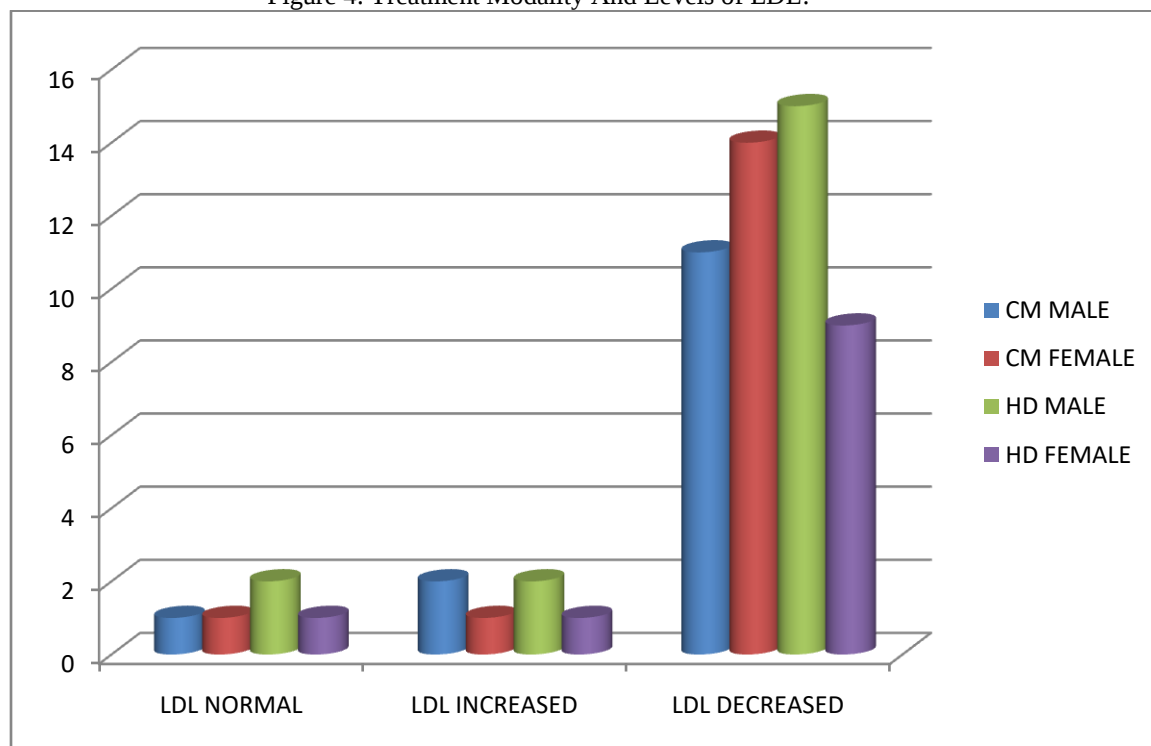
On correlating the effect of treatment modality on levels of LDL, it was seen that out of 30 patients on conservative management, 2 had normal levels of LDL (1male+1female). 3 patients had increased levels of LDL (2 male+1female), 25 (11males+14 females) had decreased levels of LDL whereas the patients on HD showed normal levels in 3 cases(2 males+1females), increased levels in 3 cases(2 males+1female) and decreased levels in 24 cases(15 males+9 females).

On statistical analysis the change in value of LDL levels with treatment modality was not significant .

TABLE 4: Treatment Modality And Levels of LDL:-

LDL(N-139-160)	No. of Cases				P value
	CONSERVATIVE MANAGEMENT (CM)		HEMODIALYSIS (HD)		
	Male	Female	Male	Female	
NORMAL	1	1	2	1	0.292
INCREASED	2	1	2	1	
DECREASED	11	14	15	9	

Figure 4: Treatment Modality And Levels of LDL:-



Treatment modality and levels of TGs

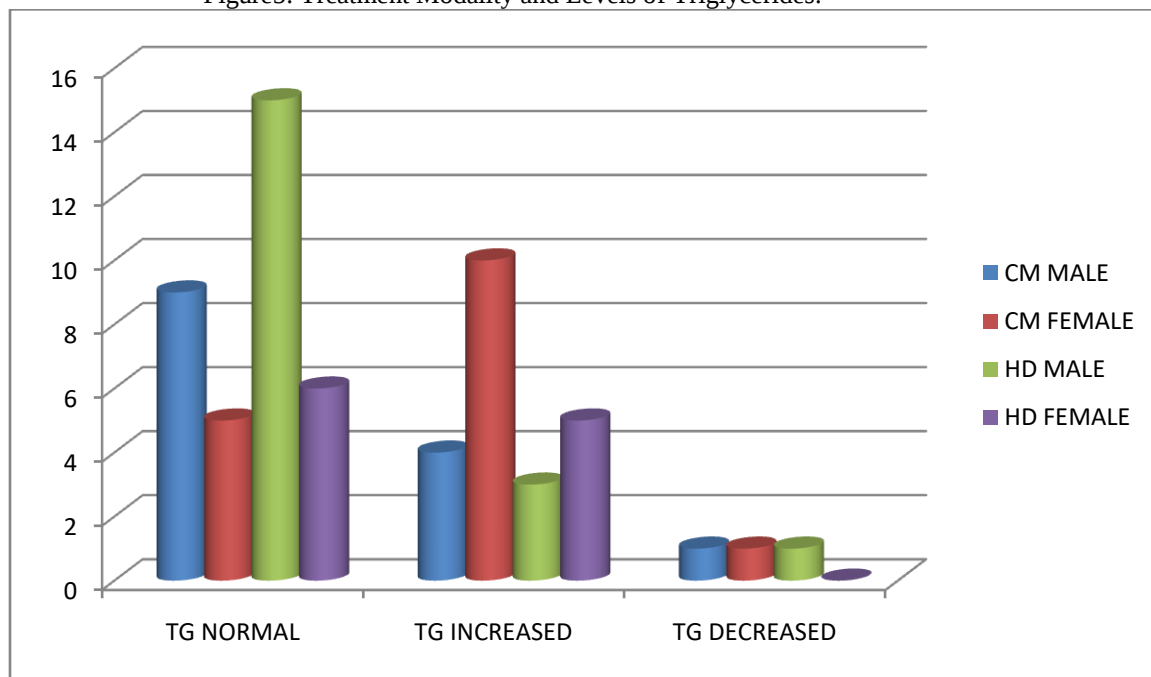
On correlating the effect of treatment modality on levels of TGs, it was seen that out of 30 patients on conservative management, 14 had normal levels of TGs (9 males+4 females), 14 had increased levels of LDL (4 males + 10 females), 2 (1 male+1 female) had decreased levels of LDL whereas the patients on HD showed normal levels in 21 cases (15 males+6 females), increased levels in 8 cases (3 males+ 5 females) and decreased levels in 1 case (1 male).

On statistical analysis the change in value of TG level with treatment modality was not significant.

TABLE 5 : Treatment Modality and Levels of Triglycerides:-

TABLE 3: Treatment Modality and Levels of Triglycerides:					
TRIGLYCERIDES (male-60-165mg/dl,female-40-140 mg/dl)	No. of Cases				P value
	CONSERVATIVE MANAGEMENT (CM)		HEMODIALYSIS (HD)		
	Male	Female	Male	Female	
	NORMAL	9	5	15	
INCREASED	4	10	3	5	0.165
DECREASED	1	1	1	0	

Figure5: Treatment Modality and Levels of Triglycerides:-

**Treatment modality and levels of VLDL**

On correlating the effect of treatment modality on levels of VLDL, it was seen that out of 30 patients on conservative management 22 had normal levels of VLDL (11M+11F). 8 patients on CM had increased levels of VLDL(3M+5F). The patients on HD showed normal levels in 25 cases(16M+9F), increased levels in 5 cases(3M+2F) .

On statistical analysis the change in value of VLDL levels with treatment modality was not significant.

TABLE 6: Treatment Modality And Levels of VLDL:-

VLDL(UPTO 34 mg/dl)	No. of Cases				P value
	CONSERVATIVE MANAGEMENT (CM)		HEMODIALYSIS (HD)		
	Male	Female	Male	Female	
NORMAL	11	11	16	9	0.347
INCREASED	3	5	3	2	

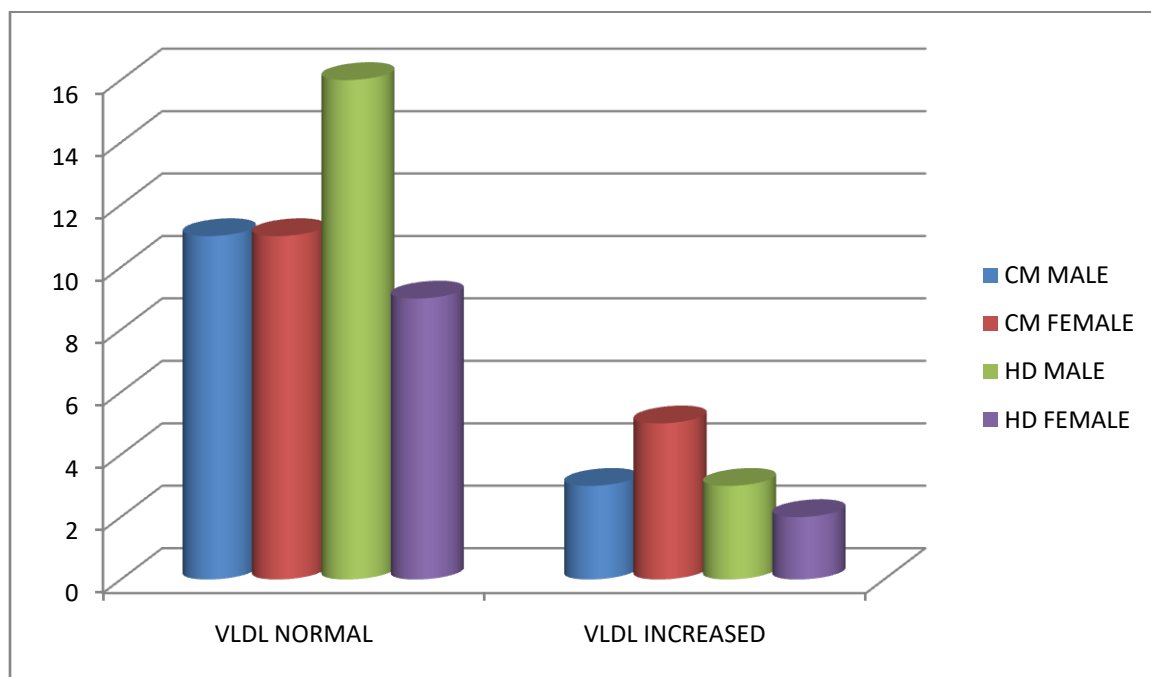


Figure 6: Treatment Modality And Levels of VLDL:-

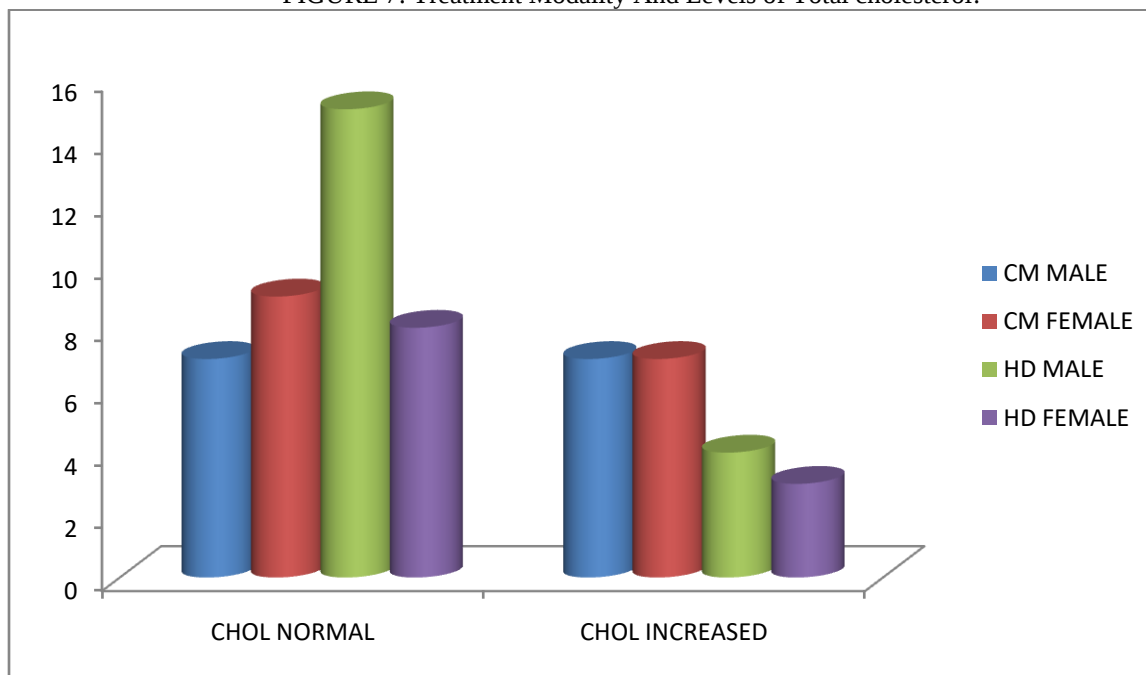
Treatment modality and levels of total cholesterol

On correlating the effect of treatment modality on levels of Total cholesterol, it was seen that out of 30 patients on conservative management 16 had normal levels of total cholesterol (7males+9 females). 14 patients on CM had increased levels of total cholesterol (7 males+7 females). Out of 30 patients on HD, 23(15 males + 8 females) showed normal levels of total cholesterol and increased levels in 7 cases(4 males + 3 females). On statistical analysis, the change in value of total cholesterol levels with treatment modality was not significant.

TABLE 7: Treatment Modality And Levels of Total cholesterol:-

TOTAL CHOLESTEROL (UPTO 200 mg/dl)	No. of Cases				P value
	CONSERVATIVE MANAGEMENT (CM)		HEMODIALYSIS (HD)		
	Male	Female	Male	Female	
NORMAL	7	9	15	8	0.100
INCREASED	7	7	4	3	

FIGURE 7: Treatment Modality And Levels of Total cholesterol:-



Distribution of patients of CKD in different stages

Distribution of patients in different stages of CKD:-

STAGE OF CKD	GFR (ml/min/1.73m ²)	No. of patients
3	30-59	11
4	15-29	13
5	<15	36

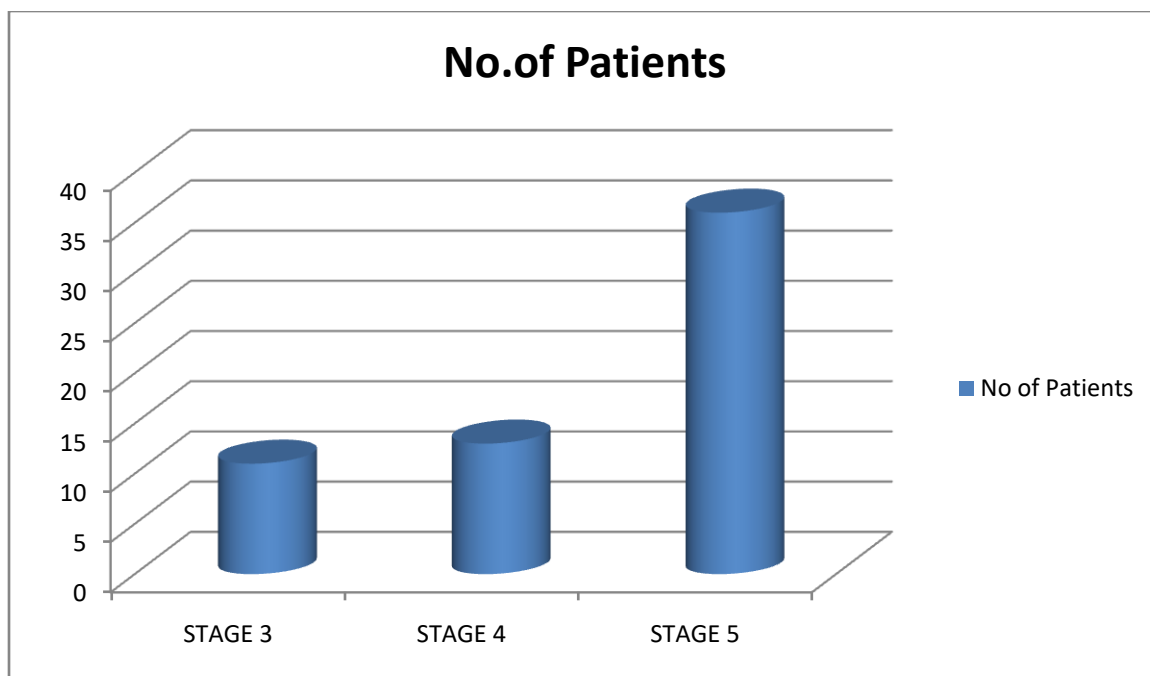


Fig 9: Distribution of patients in different stages of CKD

Discussion:-

In present study, there was no statistically significant difference in dyslipidemia of the patients on hemodialysis and that of those on conservative management. However, there was decrease in HDL and LDL level and levels of TG, VLDL, and TC were normal in majority of patients irrespective of age, sex and treatment modality.

The present study agrees with the study done by Dipika et al. which showed no significant difference in the levels of the composition of lipid profile in both their groups (patients undergoing hemodialysis and those on conservative management).

Nelva et al supported the results of our study in the way that there was no significant difference in levels of total cholesterol, HDL, LDL in patients undergoing hemodialysis as compared to healthy controls. Though significant difference was observed in levels of TG which showed higher levels in both the groups .

Similar finding elucidated by Rao et al from their study observed that HDL cholesterol levels were reduced in all their study groups but were not statistically significant supporting the findings of our study. Total cholesterol levels remained unchanged in majority of patients. However there were significantly high levels of TG and VLDL in non dialysed patients with CKD in this study. The present study differs from the study of Raju et al who demonstrated dyslipidemia was observed in CKD patients characterized by a statistically significant increase of serum triglycerides and VLDL with a decrease in serum HDL-C in both non dialysis and hemodialysis groups when compared with the controls.

Arif et al observed significant increase in cholesterol, LDL, TG, and VLDL while a significant decrease in HDL levels was seen in patients with CRF as compared to controls .

STUDIES	TC	HDL	LDL	TG	VLDL
Present study	normal	decreased	decreased	normal	Normal
Dipika et al	normal	decreased	normal	increased	Increased
Nelva et al	normal	normal	normal	increased	-
Rao et al	normal	decreased	-	increased	Increased
S S K Raju et al	increased	decreased	increased	increased	Increased
Rusuf et al	-	decreased	-	increased	Increased

The various differences of the present study from other above quoted studies could be due to difference in sample size and time period of study. Difference in dietary habits of the study groups could be another factor responsible for the difference. However all the studies signify the importance of studying and managing dyslipidemias in early stages of CKD helping in prevention of its progression and also reducing incidence of cardiovascular disease in such patients.

A strict monitoring of lipid profile and lipoproteins can thus reduce the morbidity and mortality rate and will also improve the quality of life of CRF patients.

On the basis of the findings of the present study, it is further suggested that prescribing lipid lowering treatment in CRF patients with dyslipidemias for preventing future episode of cardiovascular events could help and will also preserve renal function.

Conclusion:-

1. Levels of both HDL and LDL were reduced in majority of cases in both the groups. However the findings were statistically non significant in both the groups.
2. Level of triglycerides were normal in most of the patients. But on statistical analysis the difference in levels was not significant.
3. This study demonstrated normal levels of VLDL in both the groups with no statistical significance on further analysis.
4. Even the levels of total cholesterol followed the same trend with most of the patients showing normal levels irrespective of modality of treatment.

The present study therefore concludes that there was no statistically significant difference in dyslipidemia of the CKD patients on hemodialysis and those on conservative management.

Thus hemodialysis has no significant role in management of dyslipidemia in CKD patients .

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